



# Developing Guidelines to Risk Stratify Patients that would Benefit from VTE Prophylaxis Upon Discharge



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## Introduction

Venous thromboembolism (VTE) is the second leading cause of mortality in cancer patients. They are 4-7 times more likely than non-cancer patients to develop VTE, and approximately 20% of all VTE are diagnosed in this patient population. (Streff, Farge, Heit) The increased susceptibility of cancer patients to VTE is multifactorial, including but not limited to: age, race, sex, comorbidities, BMI, Virchow's Triad, hypercoagulable/pro-thrombotic state, and anticancer treatment. (Conner, Abdol) This patient population requires special attention for admission, pre-operative anticoagulation, as well as post-operative anticoagulation and management as they have a higher rate of VTE, as well as higher rates of VTE recurrence and bleeding complications than patients without cancer.

The topic of cancer associated thrombosis (CAT) is already complex, and when this population is undergoing major surgery, they are at a higher risk of VTE than the regular population. Guidelines from ASCO, ITAC, SEOM, and NCCN recommend pre-operative thromboprophylaxis and recommend that thromboprophylaxis be continued for 7-10 days at least, with both Caprini score and NCCN guidelines recommending thromboprophylaxis for 28-30 days in high risk patients undergoing major abdominal or pelvic surgery (Streff). High risk patients include those with restricted mobility, obesity, history of VTE, surgery > 2 hours, malignancy, advanced stage cancer, bed rest >4 days, age >60 years, or additional risk factors. (NCCN).

## Conclusion

To obtain the data for this study we reviewed medical records from 2020-2022 and included any cases that had DVT/PE on re-admission after previous new cancer diagnosis/surgery. We were unable to effectively capture all of the data we wished, as new cancer diagnoses that are not formally staged during a patient's hospitalization were not able to be captured in our data set. Despite multiple attempts as harvesting data different ways, we were only able to capture the data from patient's with formal cancer diagnoses entered into the system.

Of these cases reviewed, 67 patients with new cancer diagnoses had been re-admitted for DVT/PE, 50F and 17M. 37 of these patients were colorectal patients, 30 of these patients were gynecological oncology patients, 6 were TACS patients, and two other miscellaneous patients. Two were discharged home on anticoagulation, 28 were undergoing chemotherapy at the time of DVT/PE.

This small patient population was not useful for any statistical analysis. We would encourage the use of a BPA to decrease these numbers in the future as there is clearly an opportunity for improvement. This study lends itself to further investigation once the BPA is instituted and now that more oncologic surgeries are being performed with the addition of a hepatobiliary surgery service at NGHs.

## BPA

National Comprehensive Cancer Network®			
NCCN Guidelines Version 2.2023			
Cancer-Associated Venous Thromboembolic Disease			
VTE PROPHYLAXIS OPTIONS: AMBULATORY MEDICAL ONCOLOGY PATIENTS AND PATIENTS POST-MEDICAL ONCOLOGY DISCHARGE (VTE-2) <sup>a,h</sup>			
Agent	Standard Dosing	Renal Dose	Other Dose Modifications
Apixaban <sup>19</sup>	2.5 mg PO twice daily	Avoid if CrCl <30 mL/min	Avoid if platelet count <50,000/ $\mu$ L Avoid if weight <40 kg
Rivaroxaban <sup>20</sup>	10 mg PO once daily	Avoid if CrCl <30 mL/min	Avoid if platelet count <50,000/ $\mu$ L
Dalteparin <sup>k,21</sup>	200 units/kg SC daily x 1 month, then 150 units/kg SC daily x 2 months	Avoid if CrCl <30 mL/min	Avoid if platelet count <50,000/ $\mu$ L
Enoxaparin <sup>k,22</sup>	1 mg/kg SC daily x 3 months, then 40 mg SC daily	Avoid if CrCl <30 mL/min	Avoid if platelet count <50,000/ $\mu$ L

Table 1. Caprini Risk Assessment Model

1 Point	2 Points	3 Points	5 Points
Age 41-60 y	Age 61-74 y	Age $\geq$ 75 y	Stroke (< 1 mo)
BMI > 25	Arthroscopic surgery	History of VTE	Elective arthroplasty
History of major surgery (< 1 mo)	Major open surgery $\geq$ 45 min	Family history of VTE	Hip, pelvis, or leg fracture
Varicose veins	Laparoscopic surgery > 45 min	Positive Factor V Leiden	Multiple trauma (< 1 mo)
Swollen legs	Cancer (past or present)	Positive prothrombin 20210A	Acute spinal cord injury (< 1 mo)
Acute MI	Patient confined to bed (> 72 h)	Elevated serum homocysteine	
CHF (< 1 mo)	Immobilizing plaster cast (< 1 mo)	Positive lupus anticoagulant	
Sepsis (< 1 mo)	Central venous access	Elevated anti-cardiolipin antibodies	
Serious lung disease		Heparin-induced thrombocytopenia	
COPD		Other congenital or acquired thrombophilia	

Caprini score	Risk category	Recommended prophylaxis	Recommended duration of chemoprophylaxis
0	Lowest	Early frequent ambulation only, OR at discretion of surgical team: compression boots OR low dose heparin OR low molecular weight heparin	During hospitalization
1-2	Low	Compression boots OR low dose heparin OR low molecular weight heparin (choose 1 item)	During hospitalization
3-4	Moderate	Compression boots AND low dose heparin OR low molecular weight heparin (choose 1 medication)	During hospitalization
5-8	High	Compression boots AND low dose heparin OR low molecular weight heparin (choose 1 medication)	7-10 days total
$\geq$ 9	Highest	Compression boots AND low dose heparin OR low molecular weight heparin (choose 1 medication)	30 days total

## Study Objective

By using a combination of scoring systems to assist in risk stratification, the goal is to provide appropriate pre-operative and post-operative prophylaxis in high risk populations by utilizing an inclusive Best Practice Advisory (BPA). This BPA would include three different recommendations to include a variety of patients. The Khorana risk score (KRS), a validated risk stratification tool that can identify ambulatory patients with cancer receiving chemotherapy who are at increased risk for VTE (Khorana). The Caprini score, a validated scoring system to identify patient's who are high risk for DVT after surgery (Caprini, Gould). As well as the NCCN guidelines, for patients newly diagnosed with cancer. Based on these data, the option of thromboprophylaxis for ambulatory, at-risk patients, with and with-out cancer can be standardized for improved utilization and improved patient outcomes.

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